

# API:Tutor

A mission to facilitate entry to programming technologies in youth.

October 1, 2015

Sameer Bajaj: Observed and conducted interviews of students. Helped develop persona descriptions and the affinity diagram with the group. Defined a work model based on student's perspective.

Daniel Brenners: Defined work models and how they impacted our understanding. Helped create personas and organized the group presentation.

Dina Bseiso: In addition to conducting and annotating contextual inquiries, Dina illustrated personas defined by the group. Dina also storyboarded a scenario, as well as elaborated on other plausible scenarios.

Jordan Kellerstrass: Worked on contextual inquiries. Helped develop personas and affinity diagram. Created cultural and sequence models.

## Contextual Inquiries

Our group elected on a top-down approach in conducting our inquiries, such that we first surveyed the group as a whole for their highest ranked personal values. We then broke them up into smaller focus groups, discussing which websites conveyed values they agreed with, and why. Finally, we focused on select individuals as they interacted with tutorial interfaces already in existence, noting their frustrations, side-comments, and display of relief. Please note that websites mentioned in the summaries below are not referenced, as the principles should be abstracted and not restricted or influenced by the singular design.

### Large Focus Group: Personal Values

The exercise was led by visiting lecturers, Ricky Holtz and Ellen van Wyk, in leading a portfolio workshop. The lecturers challenged the nine students present to pick from a list of values their top five values, which eventually was cut down to three. We took a tally of the values amongst all the students, and noticed that Creativity and Family ranked among the highest with three votes each.

### Small Focus Group: Website Values

#### Person A

Gender: Female

Age: 20s

Job Title: College Student

Location of Interview: South Hall 206

Who Conducted Interview: Sameer Bajaj

Who Took Notes: Dina Bseiso

Person A, unlike all other students, is a college student. Her model website was that of a vineyard, which she said "doesn't have to do with [her] values, but it is aesthetically pleasing." Through some additional thought, however, we determined that it actually did have to do with her values on an implicit level. One of her values was that of "Luxury." The website was of a vineyard which had elegant displays of people, place, and product. It displayed such information with ease, to which she commented "the font is not overwhelming." For this user, importance in experiencing a website are the perceived beauty of the interface, that is visually accessible and displays features of emotional positivity.

### **Person B**

Gender: Female

Age: Teenager

Job Title: High School Student

Location of Interview: South Hall 206

Who Conducted Interview: Sameer Bajaj

Who Took Notes: Dina Bseiso

Person B was brief in her answers, and did not comment on the values the website maker prioritizes. The website she showed she described as “simple” and exhibiting “interesting visuals in between.” The visuals she referred to were of animated objects responsive to the user’s actions on the website. While Person B did not provide further insight, Person C responded to the website aversely (“aw, I don’t like that, too much movement when I’m trying to read text.”) and proceeded to display her model interest.

### **Person C**

Gender: Female

Age: Teenager

Job Title: High School Student

Location of Interview: South Hall 206

Who Conducted Interview: Sameer Bajaj

Who Took Notes: Dina Bseiso

Person C has vocalized an interest in videogames and wanting to create one. The website she displayed was of an acclaimed videogame company’s star product, stating that “it is pretty, and art takes a long time to draw. This website promotes dedication.” Person C’s values were happiness, acceptance, and dedication, conveying that this site may have further resonated with her beyond the categorical level of interactivity, but on an abstract, conceptual level. This insight is important and ties in with Person A’s remark on how she did not feel as though there was a connecting thread between her values and the websites, but later realized that there was one through implicit design on an abstract level. No where does Person A’s website or Person C’s website explicitly state “this is luxurious,” or “we spend a lot of time working on our product/drawing.” These statements are understood implicitly through what is displayed on the respective websites, which have a natural connection to the users observing them.

Duration of Interview: 30 minutes

## **Individual Contextual Interviews**

### **Person D**

Gender: Male

Age: 12 years old

Job Title: Middle School Student

Location of Interview: South Hall 206

Who Conducted Interview: Sarah van Wart/Dina Bseiso

Who Took Notes: Dina Bseiso

Person D frequently referenced a powerpoint containing step-by-step instructions, and manipulated the dimensions of his windows in order to see the instructions while coding. When clarifying points, he would point to areas on the screen. At one point, he poked the monitor as though it were a touch screen, despite having interacted with the laptop via the trackpad only moments before. When left alone, he was not afraid to experiment on his own; however, once he grew content with his progress, he would sit patiently and await further explicit direction. He showed little difficulty with maneuvering between different tabs on the browser window. At one point, he began troubleshooting his way through a little experiment of his within the scope of the project, and read into the code prepared for him. Person D was exposed to a website, <http://coolors.co>, for quickly accessing color options for his animation. He took a liking to this interface, and found the color-locking tools intuitive without any verbal explanation. He changed the color of a graphic he was

actively manipulating, saying, "I want to have a neon one that stands out." By doing so, he discovered key properties in the JavaScript code, such that we had the following exchange:

Person D: What is "window"?

Dina: It refers to your screen.

Person D: OH!

Duration of Interview: 60 minutes

### **Person E**

Gender: Female

Age: Teenager

Job Title: High School Student

Location of Interview: South Hall 206

Who Conducted Interview: Jordan Kellerstrass

Who Took Notes: Dina Bseiso

Summary: Person E initiated a request for help in exploring advanced JavaScript techniques to execute a particular idea she had in mind. Her idea revolved around controlling aesthetics and exercising the lack of restraint on creativity. She believed her only restraint, in fact, was knowing the proper coding vocabulary and syntax in order to implement the effect she sought. As she was learning the advanced technique in randomizing the colors her bubbles took on, she would reiterate the lessons and point at relevant lines of the code to reassure she was consolidating the novel information correctly. She did not commit the exercise without mistake, and took the mistakes in stride and without much effect on her affect at all.

Duration of Interview: 45 minutes

### **Person F**

Gender: Female

Age: 20s

Job Title: College Student

Location of Interview: South Hall 206

Who Conducted Interview: Sameer Bajaj

Who Took Notes: Sameer Bajaj

When introduced to the basic concept behind material design, Person F immediately started searching for websites that were built on the material design framework. She was fascinated with the flat design and animations in most of those websites and eventually came across a gaming website that was material designed. As she played around, she exclaimed, "Wow! This feels like I'm actually interacting with different materials to move this ball around." She felt that the material design added a little warmth and humanity to digital design and that it felt like a relief from every other website that looks and behaves the same.

Duration of Interview: 30 minutes

### **Difficulties:**

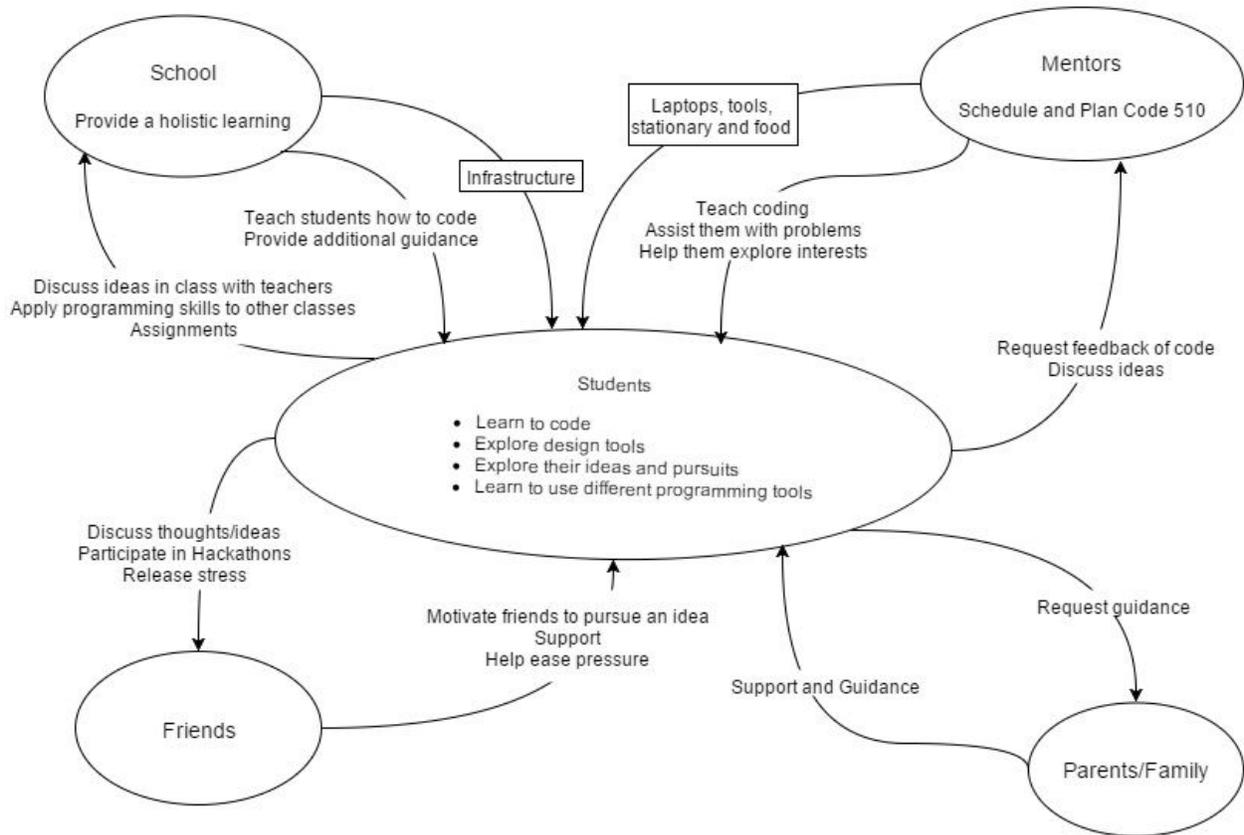
Annotating the scene as it unfolds between master and apprentice is particularly tricky, in that the exchanges may be rapid and also information-rich. It also takes skill to legibly note what is occurring while also paying attention to the unsaid gestures that are also information-rich. It was easy to note moments of frustration, disagreement amongst the users, and elation, all of which we discussed are important to the coding (and generally with technology) experience.

# Affinity Diagram



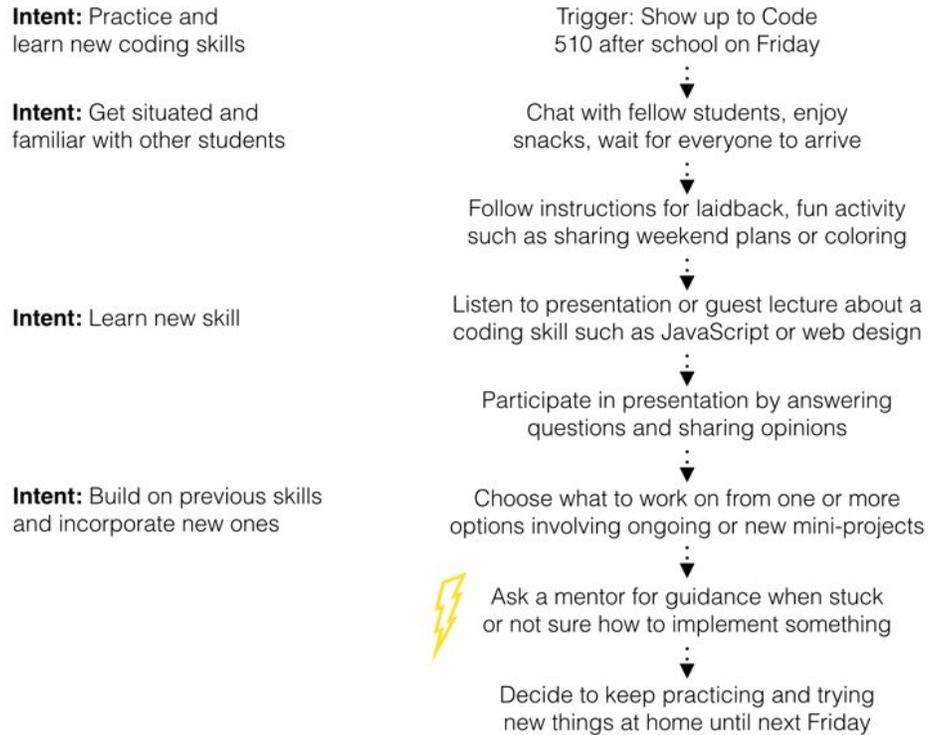
## Work Models:

### Flow Model



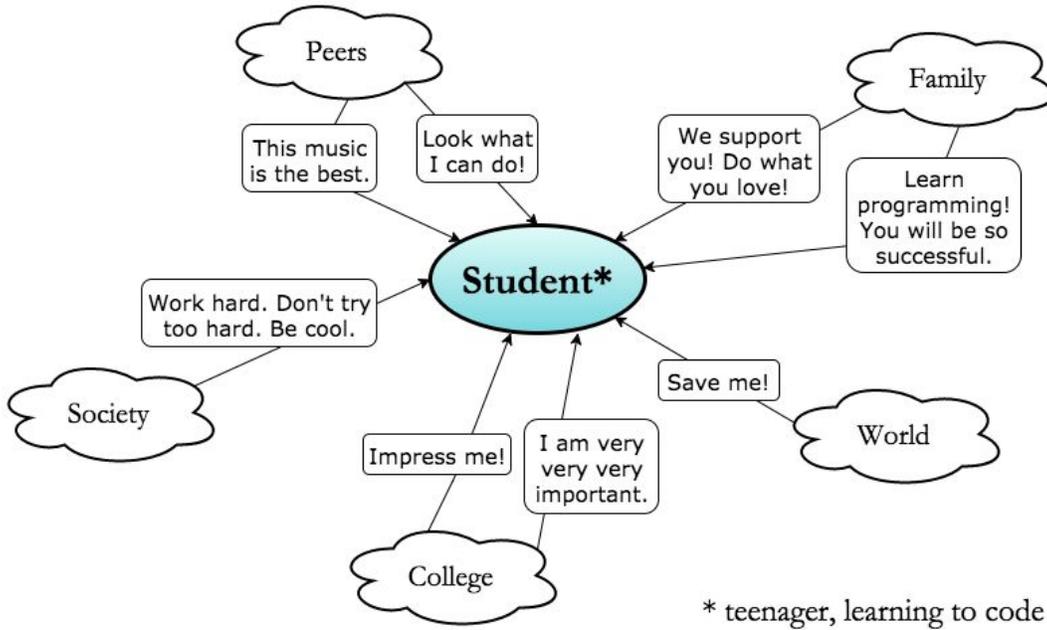
The flow work model depicts the various interactions of students in code 510. The primary interaction of students is with the mentors. The mentors usually take a coding session on a specific programming language. Occasionally there's an idea brainstorming session that helps the students' evaluate their goals. During these sessions, the students contact the mentors in case they are stuck with a problem or need assistance while using a design tool. Many of the students perform the same activities in school and discuss their ideas with teachers. Family and friends are also one of the support systems for these students. It was fascinating to observe how friends were playing a big role in motivating some of the students to be more creative with their code.

## Sequence Model



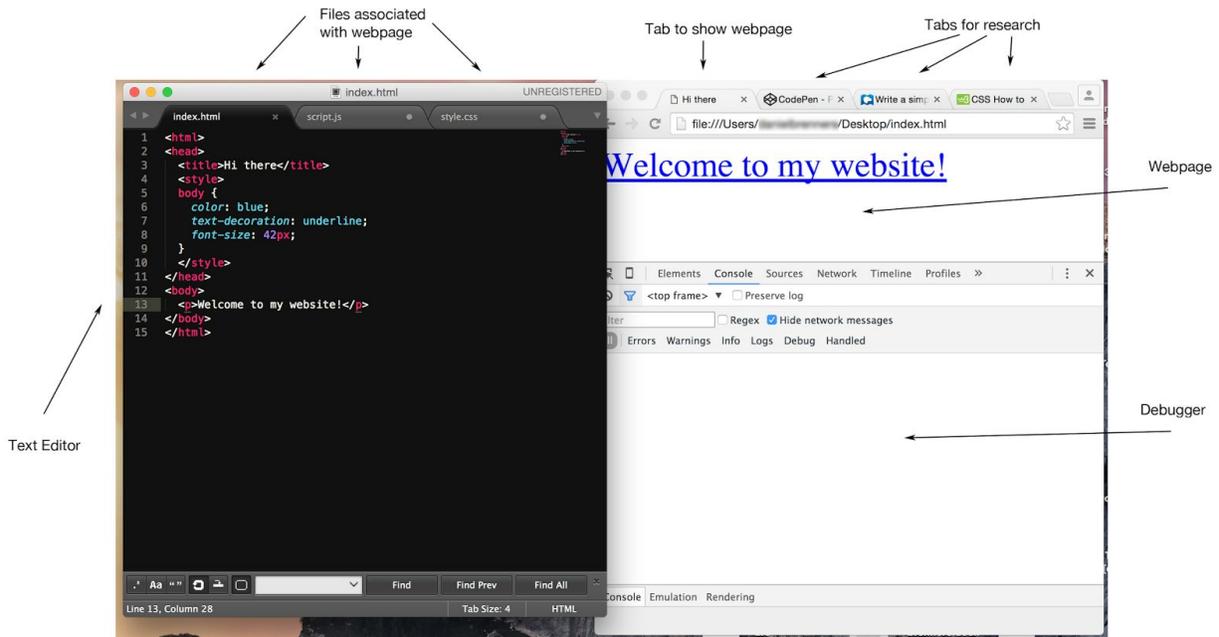
This work model illustrates the sequence of events in a typical Code 510 session from the perspective of a participating student. Students reach a level of focus and engagement by first getting comfortable with the environment and each other through a low-stress, low-pressure activity. This is followed by instruction on a new topic which the students can incorporate in their projects or daily lives, and some minimally-structured work time for ongoing or new programming projects. The API Tutor aims to supplement this independent yet sociable work time in multiple ways including stretching the boundaries of what students perceive as possible by guiding them through the additional skill of using APIs.

## Cultural Model



The cultural work model paints a picture of the cultural influences apparent when a student is at work learning to program. High school provides a culture of its own with students looking to their peers for direction while trying to discover their own voices. At the same time, society, colleges, and families provide suggestions for the student to plan their lives around. Students in Code 510 were prompted to reflect on their values and the two most common responses (out of three per student) were family and creativity. This could be a reflection of cultural influences or the types of students who are drawn to a program like Code 510 or both.

## Artifact Model



The artifact model above depicts the students' computer screens while they do work at Code 510. Typically, one side of the screen will be dedicated to the coding aspect, while the other shows the output generated from the code. Many students felt this way was helpful in seeing immediate feedback from the code that they write. Frustration usually occurred as a result of getting lost in some of the tabs within the browser or their text editor. The organization above may depict an attempt to minimize "context switching" between writing code and checking the output.

## Scenarios

### Code 510: Collaborative Programming Education



#### Learning to Code at Home:

Jo decides that he would like to explore how things work on the Internet, due to his interest in videogames. He knows that it involves a term called “programming,” but doesn’t quite know what that means. After doing a quick Google Search and skimming the results, he clicks on a readily available YouTube video entitled “What is Programming?” and quickly becomes confused. He does not know where to begin in his endeavor to learn how to program. Jo’s parents do not have prior programming experience, and neither does his dog, Rufus. So, learning to code from home is not very successful for Jo.

#### API Tutor as Part of Mainstream Education Curriculum

Due to Brittany’s busy schedule, she elects to set aside time spent at school for learning how to improve her technical capabilities. There is a new class rumored to be offered, focused on introducing programming principles to the students in a collaborative way via projects. The teacher would make use of the API tutor as a complement to their lesson plans, as assignments meant to be completed either for homework or as a means to solidify the lesson plan’s teachings. Because the modules are readily available for a teacher to use, they can focus their time not on designing new assignments, but on conveying the material in a depth that accommodates multiple learning styles. API Tutor would be ideal for all skill levels: for those who need

an additional challenge, for those who need additional material to solidify their understanding, and for those who need another method to approach the work.

### **API Tutor in Group Socializing**

Bored from school, Chris excitedly goes to his friend's house. Previously, they discussed various app ideas involving the use of APIs. Not really knowing how to best work with a particular organization's API, Chris and his friends were thrilled to discover the API Tutor. Once Chris arrives to his friend's house, he pulls out his laptop while his friend navigates to the site so that they may learn and collaborate to create their new awesome idea.

## Personas

### Jo



Jo is a 12-year-old boy in middle-school, and his access to technology is moderate. He has a smart-phone, and shares a home computer. His parents disallow Facebook usage. He doesn't have any coding experience; however, he loves videogames and aspires to be a videogame designer when he grows up, as well as a DJ due to his love for music. Jo is a quick learner, and is considerably tech-savvy, resolving issues with technology at home when they arise. Jo is more interested in experimenting and challenging possibilities than the look or design of experiences and products. With regard to school performance, Jo gets good grades and is a slow reader. He is not actively dedicated to activism, but cares deeply about animals. This care may be influenced by his pet golden retriever, Rufus.

## Brittany



Brittany is a 16-year-old highschooler, very prominent on social media sites due to her high-access to technology via her iPhone and personal laptop. At a younger age, she used to be an avid videogamer; however, due to her recent involvement in the mock-trial team, badminton team, summer-internships (and general school attendance when it isn't summer), videogaming has fallen to the wayside. She is also involved in theater productions, as well as recreational photography, owning a DSLR camera of her own. Brittany considers herself to be an activist in civil rights, attending events when she can with her camera, and maintaining her blog through tumblr; despite this exposure to customizable HTML/CSS layouts, she is not much of a coder. And while she likes pretty things, she would sacrifice beauty for conveying the truth. Brittany comes from an immigrant family, but she was born in the United States herself. She gets decent grades, is a fast reader, and loves pop music.

## Chris



Chris is a 17-year-old senior in high school living in the suburbs, ambivalent about furthering his education. He thinks school is a waste of time, yet despite this he achieves high marks in math. He prefers to spend time on his own projects, such as building videogames inspired by games he has played and enjoyed (or hated). Some of these games he has posted online for purchase, hoping that these steps will assist him in becoming the next Zuckerberg. Although he has this high goal, he has low self-esteem, and his social net is small, composed of but a couple close friends he has known since elementary school. Chris also has little patience, and this manifests in his introversion. While recognizing that social activism issues are important, he isn't particularly concerned with social activism personally unless there is a monetary gain.

## Reflection of Contextual Inquiry

Contextual inquiries were easy to conduct in that our users were engaged and not bothered by our presence or explicit inquiries. The users were transparent and honest in their interactions, seemingly uninfluenced to behave in ways that are considered atypical (as defined by their peers, who are familiar with their peer group's typical behaviors).

Difficulties were encountered when considering the pace of the observations. It is difficult to discern in the moment what may be of value later, so best-judgment was used to decipher which actions were relevant to the interactions with technology (specifically, an interface to learn how to code, in an environment that facilitates learning how to code); however, more than what was necessary was captured, as well as underlying concern of useful information left uncaptured. This worry could have been abolished by consenting our users to a videotaping session, and extensive annotation of the video; however, such efforts may have been out of scope for the assignment at hand. Especially considering the quantity of contextual interviews needed to be gathered in the time that our users were available to us.

We expected to require time to adjust to the setting, as it was first and foremost a space of instruction and collaboration. We also expected to gain a variety of interests from the users. What we did not expect to see was that, within the broad spectrum of values ranked by our users that there would be a couple values that were shared in common (with a small sample size kept in mind). Such a finding was incidental, in wanting to quantify something in an environment highly qualitative.

Questions of current intentions while engaged in a scenario seemed to work best, while questions about future intentions were difficult for our users to provide answers for. These latter questions led to vague answers, laced with hesitation due to perceivability of accomplishment. Questions about a student's interests lead to in-depth answers quite easily, which often helped orient the student in thinking about future goals within the context of coding.

It was difficult to determine the cultural model. The culture inside of the classroom setting is very fluid and there is no definitive policy that constricts how work is done. The students dictate much of the culture within the setting, which varies widely from week to week. The instructors manage the classroom, but want to keep the space fairly free of constraints during different sessions. This was somewhat difficult to capture in a cultural work model.

Physical models and artifact models were much easier to produce. We were able to observe the working space as well as the personal environment of students while they were programming. This allowed us to easily depict how the classroom is run in space as well as how students managed different artifacts to accomplish tasks.

The flow model probably helped the most to develop an understanding of the students. By analyzing the classroom with this model in mind, we were able to define driving forces behind how students learned and were motivated to work on projects. Also, the artifact model helped identify the current state of how students worked. Since our project aims to fit within a student's' current workflow, it is important to analyze how they create projects before designing our own tool. The least helpful might be the physical model, since the physical layout of the room does less to help us understand how students learn to code and how they currently program.